REMARKS

Reconsideration of the application is respectfully requested for the following reasons:

1. Confirmation of Election

Although elected claims 1, 2, 4, 5, 14, 20, and 21 have been canceled, the subject matter of new claims 22-36 is restricted to subject matter included in the original elected claims.

2. Objections to Specification and Claims, and Rejection Under 35 USC §112, 2nd Par.

The claims, specification, and abstract have been revised to place the application in proper U.S. format and to correct numerous grammatical and idiomatic errors. Because the changes are all formal in nature, it is respectfully submitted that the changes do not involve new matter.

3. Rejection of Claims 1, 2, 4, 5, 14, 20, and 21 Under 35 USC §102(b) in view of U.S. Patent No. 4,127,835 (Knutson)

This rejection is respectfully traversed on the grounds that the Knutson patent fails to disclose or suggest the following features of the claimed invention:

- **axial displacement** of a rotor relative to a **rotary shaft** (the "armature" of Knutson is not displaceable relative to 116, and the shaft 116 does not rotate); and/or
- a **helical structure** between the rotor and the shaft (the armature of Knutson is fixed to the shaft, which is actually the "pushrod" of a linear actuator, and not a rotary shaft).

The purpose of the claimed invention is to provide an electromagnetic device (whether a motor or a generator) in which as the shaft rotates, the rotor coupled to the shaft moves axially. In the elected embodiment, the rotor is coupled to the shaft by a helical structure (also known as a "screw" or "worm"). When a reverse torque occurs because of the drag provided by the load

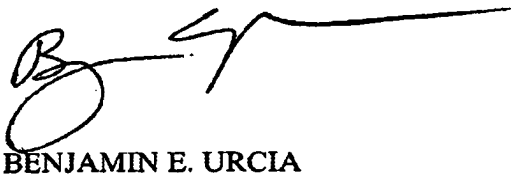
in opposition to the torque provided by interaction between the magnetic field structure and rotor (or conversely, because of the drag provided by the field structure in generator mode, which opposes an external driving force), the rotor will move axially along the shaft. This axial movement can either be used to operate a clutch or other control or testing device or, by altering the magnetic, electrical, or physical properties of the field structure or rotor in an axial direction, can be used to alter the operational characteristics of the motor or generator depending on the amount of reverse torque (with further adjustment possible through the use of an external device for controlling the amount of displacement of the rotor along the shaft).

The Knutson patent, on the other hand, merely teaches a linear actuator with springs on either end of the armature. The shaft is not a "rotary" shaft, as claimed, movement of the armature does not involve "reverse torque," and no helical structure is involved (or necessary). As a result, the Knutson patent fails to teach any of the features of the claimed invention, and withdrawal of the rejection of the elected claims under 35 USC §102(b) is respectfully requested.

Having thus overcome each of the rejections made in the Official Action, withdrawal of the rejections and expedited passage of the application to issue is requested.

Respectfully submitted,

BACON & THOMAS, PLLC



Date: April 6, 2004

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MARKED-UP COPY OF
ORIGINAL SPECIFICATION
Ser. No. 09/963,567
Examiner D. Le
Group Art Unit 2834

TITLE: ROTOR AXIAL ACTIVATION MODULATION OF ELECTRIC MACHINERY DUE TO REVERSE TORQUE

BACKGROUND OF THE INVENTION

(a) Field of the Invention

This ~~rotor axial activation modulation of electric machinery due to reverse torque is to reveal,~~ invention relates to electrical machinery having at least one rotor that is axially displaceable relative to a magnetic field structure, as a result of reverse torque. The axial displacement may be achieved through the use of a ~~between the electric machinery transmission rotating shaft and the electric machinery rotor, or between the electric machinery transmission rotating shaft and the transmission element driven, there is installed a reversible activation~~ helical mechanism and axial pre-stressed spring consist of a helical nut (and corresponding groove in the shaft) or helical nut with ball bearing or roller bearing structure that, during the operation of the electric machinery, depending on the magnitude of the torque between the electric machinery rotor and the ~~loading~~ load, ~~to produce~~ produces axial displacement ~~with~~ of the electric machinery rotor, and ~~further to modulate its electric machinery characteristics with respect~~ thereby either changes the coupling relationship between the rotor and ~~to~~ the electric machinery magnetic field, ~~or to pull~~ pulls an axial control clutch CLS100, or ~~to pull other~~ pulls another selected control structure or testing device.

(b) Description of the Prior Art

Among the rotating electric machinery products ~~sold in the market~~ currently being marketed there are electric machinery structures combining ~~the taper~~ a tapered rotor and ~~taper hole~~ tapered recess electric machinery magnetic field. When activated the axial electro-magnetic attraction force will drive the axial, normally closed activation mechanism. Its function is to act as the axial driving power source to control the normally closed activation mechanism. However, its electric machinery ~~characteristic remains singular~~ characteristics cannot easily be varied.

SUMMARY OF THE INVENTION

~~This~~ The invention ~~is about~~ involves installation of a helical nut structure, or a helical nut and ball or roller bearing structure, between ~~the~~ an electric machinery transmission shaft ~~or electric machinery transmission shaft~~ and ~~the~~ a driven transmission element ~~driven, there is installed a helical nut structure or helical nut structure with ball bearing or roller bearing structure, and depending~~. Depending on the torque between the electric machinery rotor, and on the loading ~~and the~~ or driving direction, the corresponding axial displacement of the electric machinery rotor can be controlled, and further the electric machinery characteristics ~~between~~ relative to the electric machinery rotor and the electro-magnetic field can

be modulated ~~or to pull selected~~ to achieve a desired control structure or testing device.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is ~~the~~ a cross sectional ~~illustration~~ view of the main structure of this invention.

Fig. 2 is ~~the~~ a cross sectional ~~illustration across~~ view taken along line A-A' in Fig. 1.

Fig. 3 ~~shows the~~ is a cross sectional illustration of ~~this~~ an embodiment of the invention ~~where~~ in which a reverse activation helical structure is installed between the transmission shaft of the electric machinery and the ~~loading there is installed the reverse activation helical structure~~ load.

Fig. 4 ~~shows the~~ is a cross sectional illustration of ~~this~~ an embodiment of the invention ~~where~~ in which a spring structure is installed between a dual electric machinery rotor formed in one body with the transmission shaft and ~~between the~~ dual electric machinery rotors ~~there is installed a spring structure~~.

Fig. 5 ~~shows the~~ is a cross sectional illustration of ~~this~~ an embodiment of the invention ~~where the~~ in which dual electric machinery ~~rotor~~ rotors are installed with two separate transmission shaft ~~structure~~ structures.

Fig. 6 is ~~the~~ a cross sectional illustration similar to that of Fig. 5 ~~where~~ in which a controllable clutch is installed

between each individual transmission shaft ~~there is installed controllable clutch~~.

Fig. 7 is ~~the~~ a cross sectional illustration of ~~realization of this~~ an embodiment of the invention ~~where~~ in which a pre-stressed spring is installed ~~in~~ between the two electric machinery rotors.

Fig. 8 is ~~the~~ a cross sectional illustration of ~~realization of this~~ an embodiment of the invention ~~where~~ in which the pre-stressed springs are installed on ~~the~~ outer sides of the two electric machinery rotors.

Fig. 9 is ~~the~~ a cross sectional illustration of ~~realization of this~~ an embodiment of the invention ~~where~~ in which pre-stressed springs are installed between the electric machinery rotors and on the outer sides.

Fig. 10 is ~~the~~ a cross sectional illustration of ~~realization of this~~ the invention ~~where~~ in which the two electric machinery rotors have individual transmission shafts and ~~there are installed~~ pre-stressed springs are installed between the electric machinery rotors.

Fig. 11 is ~~the~~ a cross sectional illustration of ~~realization of this~~ an embodiment of the invention ~~where~~ in which the two electric machinery rotors have individual transmission shafts and ~~there are installed~~ pre-stressed springs are installed between the electric machinery rotors and the stator.

Fig. 12 is ~~the~~ a cross sectional illustration of ~~realization of this~~ an embodiment of the invention ~~where~~ in which the two

electric machinery rotors have individual transmission shafts and ~~there are installed~~ pre-stressed springs are installed between the electric machinery rotors and between the individual electric machinery rotors and the stator.

Fig. 13 is ~~the~~ a cross sectional illustration of ~~realization of this~~ an embodiment of the invention ~~where~~ in which controllable clutches are installed between the transmission shafts of the two electric machinery rotors ~~there are installed controllable clutches~~ and a pre-stressed spring is installed between the two electric machinery rotors ~~there are installed pre-stressed spring~~.

Fig. 14 is ~~the~~ a cross sectional illustration of ~~realization of this~~ an embodiment of the invention ~~where~~ in which controllable clutches are installed between the transmission shafts of the two electric machinery rotors ~~there are installed controllable clutches~~ and a pre-stressed spring is installed between the two electric machinery rotors and the stator on ~~the outside there are installed pre-stressed spring~~ axially outside facing sides of the rotors.

Fig. 15 is ~~the~~ a cross sectional illustration of ~~realization of this~~ an embodiment of the invention ~~where~~ in which controllable clutches are installed between the transmission shafts of the two electric machinery rotors ~~there are installed controllable clutches~~ and pre-stressed springs are installed between the two electric machinery rotors and between the individual electric machinery rotors and the stator on ~~the~~

~~outside there are installed pre-stressed springs~~ axially outside facing sides of the rotors.

Fig. 16 is ~~the~~ a cross sectional illustration of ~~this~~ a preferred embodiment of the invention ~~which is~~ that forms an axial multiple circuit squirrel cage rotor structure.

Fig. 17 is ~~the~~ a cross sectional illustration of ~~the realization of this~~ a preferred embodiment of the invention ~~with~~ including an axial extension brush armature.

Fig. 18 is ~~the~~ a cross sectional illustration of ~~the realization of this~~ a preferred embodiment of the invention ~~by using the~~ that employs a reverse torque to produce axial activation in order to pull an axial control clutch.

Fig. 19 is ~~the~~ a cross sectional illustration of ~~the realization of this~~ a preferred embodiment of the invention ~~which is the~~ applied to an electric machinery magnetic field or electric machinery rotor for axial modulation settings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

~~This electric~~ Electric machinery modulated by a rotor axially activated ~~rotor due to~~ by reverse torque ~~is to reveal~~ includes, according to the principles of the invention, a reverse activation helical structure situated between the electric machinery transmission shaft and the electric machinery rotor, or between the electric machinery transmission shaft and ~~the~~ a transmission element being driven. ~~, there is installed a~~ The reverse activation helical structure ~~consist~~

~~of~~ includes a helical propeller structure or a helical propeller structure ~~with~~ having a ball ~~bearing~~ or roller bearing structure ~~that~~, which during the operation of the electric machinery, ~~through~~ as a result of the reverse torque between the electric machinery rotor and the ~~loading~~ load, ~~to drive~~ drives the electric machinery rotor to produce axial displacement, and further to modulate the electric machinery characteristics between the electric machinery rotor and the electric machinery magnetic field, ~~or~~ to pull an axial controlling clutch CLS100, or to pull ~~other~~ another selected control structure or testing device.

As shown in ~~Fig.~~ Figs. 1 ~~shows the cross sectional illustration of the main structure of this invention. Fig.~~ and 2 ~~is the cross sectional illustration of Fig. 1 along A-A'~~, the major constituents of the invention include:

--Electric machinery magnetic ~~field~~ pole structure F100~~:~~ ~~Including the~~ including constituents of DC or AC ~~generators or motors~~ generator or motor structures~~; These structures include~~ and magnetic field structures having one of the following configurations:

F1: ~~Between~~ The magnetic field or pole structure may be arranged such that the magnetic field between the ~~poles of the electric machinery magnetic field~~ pole structure and the ~~electric machinery~~ rotor ~~of which the electric machinery magnetic field~~ exhibits a normal stable even distribution; or

F2: ~~Between~~ The field structure may be arranged such that magnetic fields between the axial single side or double sides of the ~~poles of the electric machinery magnetic field~~ field structure and the ~~electric machinery~~ rotor ~~of which the axial single side or double sides~~ exhibit different ~~electric machinery~~ magnetic field ~~intensity~~ intensities so that the magnetic coupling between the field structure and the rotor varies with axial displacement of the rotor; or

F3: ~~Between~~ The magnetic fields between the axial single side or double sides of the ~~poles of the electric machinery magnetic field~~ pole structure and the ~~electric machinery~~ rotor ~~of which the axial single side or double sides exhibit~~ may be the result of different gap structures ~~with~~ relative to the electric machinery rotor to also vary the magnetic coupling with axial displacement; or

F4: ~~Between~~ The ~~the poles of the electric machinery magnetic field and the electric machinery rotor whose~~ axial single side or double sides of the pole structure ~~consist~~may consist of multiple permanent magnetic poles or magnetic poles excited by magnetic windings W100, or combinations of both which consist of axial serial structures to also vary the magnetic coupling with axial displacement; or

F5: The pole structures may be formed by two or more of the structures described in F1 through F4 to vary the magnetic coupling with axial displacement;

~~---The electric~~ Electric machinery rotor R100~~: Including~~ includes single or mixed electric machinery rotors ~~consist of~~ of the type used in various commonly used AC or DC generators or motors, such as permanent magnet, salient, hysteresis, wound, brush, turbo, squirrel-cage type AC or DC or brush or brushless, synchronous or asynchronous generators or motors, ~~whereas its~~ wherein the reverse torque structure for the rotor axial activation modulation includes:

(1) ~~Between the electric machinery rotor R100 and transmission shaft S100 there is installed the~~ A reverse activation helical structure SC100 installed between the rotor R100 and a transmission shaft S100, including a ~~consists of~~ helical propeller structure or helical propeller structure with a ball bearing or roller bearing structure, and a rotary bearing B100 and thrust bearing PB100 situated between the electric machinery rotor R100 and a single side or dual sides of the stator H100~~ there is installed the rotary bearing B100 and thrust bearing PB100,~~. The reverse activation helical structure SC100 further includes ~~and there is installed a free~~ freely movable rotating axial pre-stressed spring SP100~~,~~ arranged such that when the electric machinery rotor R100 and the transmission shaft S100 is operating as a generator or motor, ~~through~~ the torque between the electric machinery rotor R100 and transmission shaft S100 ~~acting~~ acts on the reversible activation helical structure SC100 ~~in between~~

and ~~producing~~ produces axial displacement along preset direction, so as to ~~produce~~ modulate the electric field between the electric machinery rotor R100 and the electric machinery magnetic field F100, ~~the preset modulation of the generator or motor feature or pulling axial~~ axially pull on controlling clutch CLS100, or ~~pulling~~ pull other selected control structures or testing devices; or

(2) ~~This rotor~~ The axial activation modulation of electric machinery due to reverse torque can ~~be as shown in~~ best be understood from Figs. ~~Fig.~~ 2 and 3 where, between the transmission shaft S100 of the electric machinery and the transmission structure T100 on the loading side, there is installed a reversible activation helical structure SC200 ~~consist~~ made up of a helical propeller structure or helical propeller structure with a ball bearing or a roller bearing structure, and where between the transmission shaft S100 of the electric machinery and the stator H100, there is installed a bearing SB100 for ~~the~~ rotary driving and axial displacement, and ~~there is installed~~ a bearing SB100 for the transmission shaft S100 to perform rotary driving and axial displacement, and where between the electric machinery rotor and single side or dual sides of the stator H100 there is installed a ~~free~~ freely movable rotating axial pre-stressed spring SP100 structure. A~~, whereas the~~ transmission structure T100 is provided on the output loading side~~,~~ and connected through

the axial pulling resistance and rotating bearing B500 structure to ~~connect to~~ the stator H100, such that when the electric machinery rotor R100 and the transmission shaft S100 is operating as a generator or motor, its reverse torque has the effect of producing axial displacement in a preset direction through the action of the reversible activation helical structure SC200 between transmission rotating shaft S100 and the transmission shaft on the loading side, ~~and produce the axial displacement in the preset direction,~~ so as to ~~generate the modulation of~~ modulate the ~~setting of~~ generator or electric machinery output or exert a ~~features or~~ pulling force in selected control structure or testing devices., as shown in Fig. ~~3 is the cross sectional illustration of this invention where between the transmission rotating shaft and the transmission structure on the loading side there is installed a reversible activation helical structure, of which the cross sectional illustration along A-A' is the same as Fig. 2~~; or

(3) ~~Described~~ As described in (1) above, ~~where between~~ the electric machinery rotor R100 and transmission rotating shaft S100 ~~the~~ may be installed with a reversible activation helical structure SC100 ~~consists of~~ that includes a helical propeller structure or helical propeller structure with a ball bearing or roller bearing structure, and further ~~include~~ includes using a human, ~~or~~ mechanical, ~~or~~ fluid,

or ~~electrical~~ electrically driven ~~relevant~~ device to ~~produce~~ cause axial driving ~~to~~ of the transmission shaft, modulate and ~~setting~~ set the relative positions of the electric machinery rotor R100 and ~~electric machinery magnetic field~~ magnetic field or pole structure F100 to actively control the electric machinery characteristics or to pull selected a control mechanism or testing devices~~,~~ ~~in~~ In addition, depending on ~~the~~ need, ~~to install~~ a relative displacement limitation or position locking device may be installed between electric machinery rotor R100 and transmission rotating shaft S100 ~~or position locking device~~; or

(4) ~~Described~~ As described in (1) ~~previously~~ above, installed between the electric machinery rotor R100 and transmission shaft S100 ~~the installed~~ is a reversible activation helical structure SC100 ~~consists of~~ that includes a helical propeller structure or helical propeller structure with a ball bearing or roller bearing structure. In addition, between the axial pre-stressed spring SP100 structure installed on its single side or both sides and stator H100, can be further installed ~~relevant~~ a structural device driven by human, or mechanical, or fluid, or electrical power, so as to produce a pre-stressed control and axial displacement setting ~~to~~ for the pre-stressed spring SP100, in order to actively control and ~~setting~~ set pre-stressed spring SP100 for axial pre-stress of the electric machinery

rotor R100, ~~and~~ to control and ~~setting~~ set the relative relationship of the electric machinery rotor R100 and electric machinery magnetic ~~field~~ pole structure F100, and further to control the electric machinery characteristics or to a pull selected control mechanism or testing devices; or

(5) As Described in (2) above, ~~previously between~~ before installing the transmission shaft S100 and the transmission structure on the loading side T100, there is installed the reversible activation helical structure SC200 ~~consist~~ of helical propeller structure or helical propeller with a ball bearing or roller bearing structure.~~,~~ between the transmission shaft of the electric machinery rotor R100 and the stator H100, there is installed a bearing SB100 for the transmission shaft S100 to perform rotating driving and axial displacement, and between the electric machinery R100 and single side of double sides of the stator H100 there is installed a free movable rotating axial pre-stressed spring SP100 structure. ~~, and further~~ Also included ~~include~~ is a device using a human, or mechanical, or fluid, or electrical ~~driven~~ drive ~~relevant device~~ to produce reversal driving to the transmission shaft S100, further to control and set the relative position of the electric machinery rotor R100 and electric machinery magnetic ~~field~~ pole structure F100, to actively control electric machinery characteristics or pull a selected

control structure or testing device~~, in~~. In addition, depending on the need between the electric machinery rotor R100 and transmission shaft S100, there can be installed relative position limiting device or position locking device; or

(6) ~~Described~~ As described in (2) ~~previously~~ above, between the transmission shaft S100 and the transmission structure on the loading side T100, there is installed a reversible activation helical structure SC200 ~~consist of~~ including a helical propeller structure or the helical propeller structure with ball bearing or roller bearing, and between the transmission shaft S100 of the electric machinery rotor R100 and the stator H100 there is installed the bearing SB100 for the transmission shaft for rotating driving and axial displacement.~~, and~~ Furthermore, between the electric machinery rotor R100 and single side or double sides of the stator H100 there is installed a ~~free~~ freely movable mutating axial pre-stress spring SP100 structure, ~~and further to install~~ which ~~include using~~ uses human, ~~or~~ mechanical, or fluid, or electrical driven relevant device, so as to perform pre-stressed control and axial displacement setting to the pre-stressed spring SP100, and actively control and set the axial pre-stress of the pre-stressed spring SP100 with respective to the electric machinery rotor R100, and to control and set the positional relationship between the electric machinery rotor R100

and electric machinery magnetic field F100, and further to control electric machinery characteristics or to pull selected control structure or testing device.

According to a modification of the above-described embodiments~~This rotor axial activation modulation of electric machinery due to reverse torque~~, ~~further can be~~ the helical propeller structure can further consist of ~~the~~ a transmission shaft S300 with two sections ~~of~~ supporting a clockwise (CW) and counter clockwise helical propeller~~,~~ or ~~the~~ reversible activation helical structure SC100' ~~consist of~~ including a helical propeller with ball bearing or roller bearing, to couple with the two individual electric machinery rotors R100~~, between~~. Between the two electric machinery rotors may be installed ~~with~~ a pre-stressed spring SP100~~,~~. ~~the~~ The previously described transmission shaft S300 of the dual electric machinery rotors include the one body transmission shaft structure~~,~~. Fig. 4 shows a ~~the~~ cross sectional illustration of this invention where dual electric machinery rotors are fixed ~~with~~ to a one body transmission rotating shaft while between the two rotors there is installed a pre-stressed spring structure.~~, the~~ The cross sectional illustration along A-A' is the same as Fig. 2; or may consist of two sections of individual transmission shaft S300', as shown in Fig. 5, which is ~~the~~ a cross sectional illustration of this invention ~~where~~ showing two electric machinery rotors with two sections of individual transmission rotating shaft structure, of which the cross sectional

illustration along A-A' is the same as Fig. 2; or further between the two individual transmission shaft S300' there can be installed the clutch CL100 using human, or mechanical, or fluid, or electrical power so as to combine the two electric machinery rotors for connection operation or for individual separate operation, as shown in Fig. 6. Fig. 6 is ~~the~~ a cross sectional illustration of the ~~realization example of~~ embodiment illustrated in Fig. 4, where between the two individual transmission shafts there is installed a controllable clutch, its cross sectional illustration along A-A' ~~is~~ being the same as in Fig. 2~~; the~~. The previously described two individual electric machinery rotors R100 are coupled to their individual electric machinery magnetic ~~field~~ pole structures F100 ~~structures~~, and between the two electric machinery rotors there is installed pre-stressed spring SP100, ~~and~~ the two individual electric machinery rotors R100 ~~can be~~ optionally being electric machinery rotors with the same characteristics or different characteristics, the two electric machinery magnetic ~~fields~~ pole structures F100 being coupled by the two electric machinery rotors also ~~can be~~ generating electric machinery magnetic fields of same or different characteristics.~~; this rotor~~ The modulation elements, in the form of axial pre-stressed springs, ~~axial activation modulation of electric machinery due to reverse torque its constituents include~~ may be installed in any of the following arrangements:

(1) Axial pre-stressed spring SP100 may be installed between two electric machinery rotors R100, with one of them ~~the~~ generating a reverse torque in the direction of rotation increases, and the two individual electric machinery rotors R100 ~~exhibit~~ exhibiting mutually complementary axial ~~mutual compelling modulation~~ displacement, as shown in Fig. 7 (it will be appreciated that the cross-sections along lines A-A' in each of 7-19 will be the same as shown in Fig. 2~~; as show in Fig. 7 is the cross-sectional illustration of the realization of this invention where the pre-stressed spring is installed between the two electric machinery rotors, its cross sectional illustration along A-A' is the same as Fig. 2~~;

(2) Axial pre-stressed ~~spring~~ springs SP100 may be installed ~~between~~ on axially opposite outside sides of the two electric machinery rotors R100~~ and on the outside~~, with one of them ~~the~~ generating a reverse torque in the direction of rotation increases, the two individual electric machinery rotors R100 ~~exhibits~~ exhibiting mutually opposite axial ~~mutual separating modulation~~ displacement, as shown in Fig. 8~~; as shown in Fig. 8 is the cross sectional illustration of the realization of this invention where the pre-stressed springs are installed on the outsides of the two electric machinery rotors, its cross sectional illustration along A-A' is the same as Fig. 2~~;

(3) Axial pre-stressed spring SP100 may be installed between the two electric machinery rotors R100 and also on the axially opposite outer sides, with the positive or reverse torque in the direction of rotation increases, the two individual electric machinery rotors R100 ~~exhibit~~ exhibiting complementary or opposite axial ~~mutual compelling or mutual separating modulation~~ displacement, as shown in Fig. 9~~; as show in Fig. 9 is the cross sectional illustration of realization of this invention where the pre-stressed spring is installed between the two electric machinery rotors and on the outsides, its cross sectional illustration along A-A' is the same as Fig. 2~~.

Similarly, Fig. 5 is ~~the realization example of this invention where~~ shows an embodiment including two electric machinery rotors with individual transmission structures, ~~or as shown in~~ while Fig. 6 ~~is the realization example of this invention where in this application between~~ shows an embodiment in which the individual transmission shafts are installed with controllable clutches~~,~~. ~~the~~ The principle of installation for the pre-stressed ~~spring~~ spring(s) is the same for each embodiment.

As shown in Fig. 10, ~~is the cross sectional illustration of the realization example of this invention where~~ the two electric machinery rotors ~~each has its~~ may each have their own transmission shaft ~~and~~ with the pre-stressed springs installed between the two electric motors ~~there are installed pre-stressed~~

~~springs, its cross sectional illustration along A-A' is the same as Fig. 2~~.

As shown in Fig. 11, ~~is the cross sectional illustration of the realization example of this invention where~~ the two electric machinery rotors may again each ~~has its~~ have their own transmission shaft and a pre-stressed spring may be installed between the two electric machinery rotors and the outer stator ~~there is installed pre-stressed spring, its cross sectional illustration along A-A' is the same as Fig. 2~~.

As shown in Fig. 12, ~~is the cross sectional illustration of the realization example of this invention where~~ the two electric machinery rotors may each ~~has its~~ have their own transmission shaft and pre-stressed springs may installed between the two electric machinery rotors and between the two electric machinery rotors and the outer stator ~~there is installed pre-stressed spring, its cross sectional illustration along A-A' is the same as Fig. 2~~.

As shown in Fig. 13, ~~is the cross sectional illustration of the realization example of this invention where~~ controllable clutches may be installed between the individual transmission ~~shaft~~ shafts of the two electric machinery rotors ~~there are installed controllable clutches~~ and pre-stressed springs may be installed between the two electric machinery rotors ~~there are installed pre-stressed springs, its cross sectional illustration along A-A' is the same as Fig. 2~~.

As shown in Fig. 14, ~~is the cross-sectional illustration of the realization example of this invention where~~ controllable clutches may be installed between the individual transmission ~~shaft~~ shafts of the two electric machinery rotors ~~there are installed controllable clutches~~ and pre-stressed springs may be installed between the two electric machinery rotors and the outer stator ~~there are installed pre-stressed springs, its cross sectional illustration along A-A' is the same as Fig. 2~~.

As shown in Fig. 15, ~~is the cross-sectional illustration of the realization example of this invention where~~ controllable clutches may be installed between the individual transmission ~~shaft~~ shafts of the two electric machinery rotors ~~there are installed controllable clutches~~ and pre-stressed springs may be installed between the two electric machinery rotors and between the two electric machinery rotors and the outer stator ~~there are installed pre-stressed springs, its cross-sectional illustration along A-A' is the same as Fig. 2~~.

The above stated dual electric machinery ~~rotors~~ rotor structures can be installed ~~with human~~ in manual, ~~or mechanical~~ mechanically driven, ~~or fluid~~ hydraulic, or ~~electrical~~ electrically driven ~~relevant device~~ devices so as to perform reversal driving ~~to~~ of the transmission shaft, and further to modulate and set the relative position of the electric machinery rotor and electric machinery magnetic field, so as to actively modulate electric machinery characteristics. ~~and depending on the need to install the~~ The rotor structures can further

selectively include a relative displacement limitation device or fixed positioning locking device between the electric machinery rotor and the transmission shaft.~~, or can be installed with human, or mechanical, or fluid, or electrical driven relevant device for the pre-stressed modulation and setting mechanism of the axial pre-stressed spring, to actively modulate and setting the axial pre-stress of the pre-stressed spring towards the electric machinery rotor, to modulate and preset the position relationship between the electric machinery rotor and electric machinery magnetic field, further to modulate the electric machinery characteristics or pull selected control mechanism or testing device~~.

~~The~~ in the above ~~stated~~ described electric machinery with dual electric machinery rotors, ~~and each~~ the individual electric machinery magnetic field ~~structure, include~~ structures may both ~~are~~ be generators or ~~both are~~ motors, or ~~one is~~ one may be a generator and the other ~~is~~ a motor ~~structures~~ structure.

~~This rotor axial activation modulation of electric machinery due to reverse torque its electromagnetic effect structural aspect of electric machinery rotor R100 and electric machinery magnetic field F100 include~~ The axial stack height of the magnetic core of the rotor R100 may have the following relationships to the magnetic field or pole structure:

(1) The axial stack height of the magnetic core of the electric machinery rotor is greater than that of the electric machinery magnetic field structure;

(2) The axial stack height of the magnetic core of the electric machinery rotor is equal to that of the electro-magnetic field structure;

(3) The axial stack height of the magnetic core of the electric machinery rotor is less than that of the electro-magnetic field structure.

~~This~~ The ~~rotor axial activation~~ modulation of electric machinery due to reverse torque~~, its modulation model of generator or motor characteristics by producing~~ and the resulting axial displacement between ~~its~~ the electric machinery rotor and electric machinery magnetic field, ~~includes~~ can be varied by means of controllable voltage, current, frequency, etc. inputs versus output linear characteristics of the electric generator, and controllable motor speed, torque, synchronous or asynchronous, etc. input versus output linear characteristics, or by a pulling axial control clutch CLS100 or ~~pulling~~ other selected control mechanism or testing device, as follows~~, this rotor axial activation modulation of electric machinery due to reverse torque, its reverse torque structure for rotor axial activation modulation of electric machinery includes~~:

(1) When the axial stack height of the magnetic core of the electric machinery rotor is greater than that of the electric machinery magnetic field structure, the modulation method of the electric machinery ~~function is to make~~ of the invention ~~use of~~ modulates the relationship

between the magnetic poles of the electric machinery rotor and the electric machinery magnetic field ~~in~~ as a result of the ~~axial~~ corresponding axial displacement generated by ~~using the~~ centrifugal force, so as to couple the electric magnetic machinery rotor with fixed characteristics ~~with~~ by means of a different magnetic flux density or different gap, or by means of different magnetic ~~or different exciting~~ properties or excitation method, or by means of any other different structure ~~of~~ resulting in a different electric machinery physical property ~~or electric machinery magnetic field structure of different electric machinery characteristics~~, so as to generate the needed operation and output characteristics of the generator or motor or to pull ~~the~~ a selected control mechanism or testing device;

(2) When the axial stack height of the magnetic core of the electric machinery rotor is greater than that of the electro-magnetic field, the modulation method ~~of the electric machinery function is to make~~ makes use of the magnetic poles of the electric machinery rotor and the magnetic poles of the electro-magnetic field to generate axial pulling displacement by using the reverse torque~~,~~. ~~and the~~ The electric machinery rotor coupled by the electric machinery magnetic field can be an axial multiple-section circuit squirrel-cage rotor structure, and each section of squirrel-cage rotor structure ~~with~~ can have different electric machinery characteristics, as shown in Fig. 16,

~~is the realization example of this invention in the squirrel cage rotor structure with multiple circuit, in which the cross sectional illustration along A-A' is the same as in Fig. 2~~; ~~or can be~~ rotors excited by windings; ~~or~~ rotors ~~consist~~ consisting of permanent magnetic type, ~~or~~ salient type, ~~or~~ hysteresis type, or eddy current type rotor structures~~, which has~~ having an outer diameter that varies in an axial direction~~,~~; or an armature of a commutator type electric machinery rotor~~,~~ arranged to match the axial activation modulation displacement and with specific axially extended commutator CM100, so as to increase the coupling range with electric brush BU100~~,~~, as shown in Fig. 17. ~~is the realization example of this invention in armature with axially extended commutator, in which the cross sectional illustration along A-A' is the same as in Fig. 2~~,. By re-arranging the various alternating current or direct current and brush or brushless electric machinery rotor, specifically with different outer ~~diameter~~ diameters, ~~or~~ different ~~number~~ numbers of poles, ~~or~~ different ~~method~~ methods of excitation, or ~~electric machinery rotor consists of~~ different electric machinery rotor characteristics or ~~different electric~~ structures, ~~in order to produce the~~ a desired operation and characteristics of a generator or motor and the transmission characteristics or pulling of a selected control mechanism or testing device can be achieved;

(3) ~~By installing the~~ The previously described, in (1) and (2) above, ~~of~~ electric machinery magnetic field structure and electric machinery rotor with different physical characteristics and different electric machinery structure, ~~to produce~~ produces the selected generator or motor operation characteristics by using reverse torque for axial activation modulation of electric machinery, ~~or~~ to pull axial control clutch CLS100, or to pull ~~other~~ another selected control mechanism or testing device~~. As~~, as shown in Fig. 18 ~~is the realization example of this invention in using reverse torque for axial activation modulation to pull axial control clutch, in which the cross sectional illustration along A-A' is the same as in Fig. 2~~;

(4) ~~By installing the~~ The previously described, in (1) and (2) above, ~~of~~ electric machinery magnetic field and electric machinery rotor with different physical characteristics and different electric machinery structure~~, and combining the relevant mechanism of~~ may be combined with a controllable electric machinery rotor to perform axial displacement and position setting, by externally using ~~human~~ manual, ~~or~~ mechanical, ~~or~~ fluid, or electromagnetic effect driving, so as to modulate the relative electric machinery relative coupling position between the electric machinery rotor and the electric machinery magnetic field, and further to modulate the

electric machinery operation characteristics~~,~~, as shown in Fig. 19 ~~is the realization example of this invention in the electric machinery magnetic field or electric machinery rotor for axial modulation setting, in which the cross sectional illustration along A-A' is the same as in Fig. 2,~~. ~~its characteristics is to make~~ The electric machinery of this embodiment makes use of one side of the rotating electric machinery stator for the installation of an internal circular helical structure axial modulation seat AB100, for coupling to circular pulling block AN100, ~~whereas~~ the outer side of the circular pulling block AN100 ~~are~~ being installed with a helical structure~~,~~ for ~~the~~ coupling to the inner circular helical structure of axial modulation seat AB100 ~~inner circular helical structure~~, the threads of both helical structures ~~are~~ being of irreversible transmission type~~,~~. ~~circular~~ Circular pulling weight AN100 ~~is for~~ enables the circular weight block L100 and fixed screw BL100 to be fixed to the stepping section where the rotating shaft outer perimeter is smaller, so that when the circular pulling weight AN100 is rotated by the hand wheel HD100 or pulled by some other human or mechanical or fluid or magnetic structure, it can perform axial single or double directional pulling of transmission shaft S100, so as to change the relative coupling positions between the electric machinery rotor connected to the transmission shaft S100 and the electric machinery magnetic

field, and further to modulate the electric machinery characteristics~~,~~. ~~between the~~ The circular pulling weight AN100 and transmission shaft S100 can be ~~rotary relative rotating~~ relatively rotatable, and depending on the need, there can be installed a bearing or lubricant sleeve structure.

The axial modulation preset structure example ~~stated in~~ of Fig. 19 above, due to its many structures with similar functions, ~~the realization example shown in Fig. 19 is just one of them~~ can be modified in many ways, and is not used to limit the applications~~,~~. ~~other~~ Other structures with the same functions can be derived from commonly known related functional structures.

~~This~~ The axial rotor ~~axial activation~~ modulation of electric machinery due to reverse torque, its mechanical relative displacement ~~driving~~ varying a relationship between the electric machinery rotor and electric machinery magnetic field structure, ~~includes~~ may make use of:

(1) External electric machinery rotor ~~rotary electric machinery structure~~ structures;

(2) Internal electric machinery rotor ~~rotary electric machinery structure~~ structures;

(3) Dual moving type structures in which the magnetic field structure and electric machinery rotor both are rotary;

(4) Linear electric driving.

~~This rotor axial activation modulation of electric machinery due to reverse torque, its structure includes~~ In addition, the electric machinery structure of the invention may include:

(1) Cylindrical rotating electric machinery ~~structure~~ structures;

(2) ~~Taper~~ Tapered rotating electric machinery ~~structure~~ structures;

(3) Linear electric machinery ~~structure~~ structures.

To sum up, ~~this rotor axial~~ the invention provides axial rotor activation modulation of electric machinery due to reverse torque ~~is to reveal,~~ between the transmission shaft of the electric machinery and the electric machinery rotor or between the transmission shaft of the electric machinery and the transmission element driven~~, there is installed the~~ as a result of a reversible activation helical structure ~~consist of~~ including a helical propeller structure or a helical propeller structure with a ball ~~bearing~~ or roller bearing and an axial pre-stressed spring, so that during ~~the~~ operation of the electric machinery, by use of the reverse torque and driving direction between the electric machinery rotor and the loading, ~~to modulate~~ the electric machinery rotor is caused to perform axial displacement, and ~~further to~~ thereby modulate the electric machinery characteristics between the electric machinery and electric machinery magnetic field structure, ~~or~~ pulling axial control clutch CLS100, or ~~pulling other~~ another selected control

mechanism or testing device~~, the~~. The functions are precise and the ideas are innovative~~, and the applicant has searched through previous skills and found nothing whatsoever has been revealed, hence requests to grant approval by law~~.

ABSTRACT

~~This case is about between the transmission rotating shaft of the electric machinery and the electric machinery rotor or between the transmission rotating shaft of the electric machinery rotor and the transmission element driven, there is installed reversible activation helical structure consist of helical nut structure or ball bearing or roller bearing helical nut structure and there is installed axial pre-stressed spring, and depending on the magnitude of the reverse torque between the electric machinery rotor and the loading and the driven direction status, to control the electric machinery rotor to perform axial displacement, and further to modulate the electric machinery characteristics between the electric machinery rotor and the electric machinery magnetic field or to pull the selected control mechanism or testing device.~~ The invention involves installation of a helical nut structure, or a helical nut and ball or roller bearing structure, between an electric machinery transmission shaft and a driven transmission element. Depending on the torque between the electric machinery rotor, and on the loading or driving direction, the corresponding axial displacement of the electric machinery rotor can be controlled, and further the electric machinery characteristics relative to the electric machinery rotor and the electro-magnetic field can be modulated to achieve a desired control structure or testing device.